Germs, genes and postcolonial geographies: reading the return of tuberculosis to Leicester, UK, 2001

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This paper is inspired by an outbreak of pulmonary tuberculosis in the British East Midlands city of Leicester in 2001. In an era characterized by unprecedented advances in Western medical science an event of this kind might appear surprising. It challenges the feeling of wellbeing held in many Western countries, particularly in relation to diseases that appear both temporally and spatially distant. The paper examines how the event was reported in regional and national newspaper media and considers the significance attached to scale in the interactions between experts, the media and the public. In our analysis we mobilize a particular reading based on two biological metaphors, the membrane and the gene. We use this reading to reconsider the connectivity between disease, nation and identity in a world that is increasingly fluid, mobile, anxious and uncertain.

The opening of the twenty-first century coincided with the final unveiling of the results from the human genome project. Marked as a triumph for Western biological science and the outcome of global cooperation over some 20 years, the significance of the project was reflected in a joint press conference given in 2000 by then US President Bill Clinton and the British Prime Minister, Tony Blair.[1] As the former stated, 'More than 1,000 researchers across six nations have revealed nearly all 3 billion letters of our miraculous genetic code'.[2] The human genome project was linked to an optimistic discourse and a confidence that this scientific breakthrough marked the dawn of a new therapeutic age; it appeared to bestow a new power on medical science in the prospect it offered of personalized medicine and, by implication, new opportunities for improved health.[3]

A year later, on 5 April 2001, the Public Health Laboratory Service reported news of an outbreak of tuberculosis at a community college in the British city of Leicester.[4] The outbreak was revealed after three pupils in the same tutor group were diagnosed with the disease, the most recent of which coincided with the diagnosis of their teacher with a non-infectious form on 27 March. In view of the apparent connection between the

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cases, the Leicestershire Health Authority (LHA) offered all the students in years seven, eight and nine a Heaf test, a procedure based on the century-old tuberculin skin test. Over 700 children were tested, of whom 170 were found to have positive results. Given the potential for false-positives to occur in children vaccinated with BCG,[5] further testing, involving x-rays and clinical diagnosis, was employed, revealing that of these 170 children 19 had active tuberculosis.[6] Over the subsequent months, Leicester became a laboratory for medical detective work which combined 'seeing and recording'.[7] For the LHA, this took the form of well-tried medical procedures including identification, screening and treatment.

These two events, the climax of the human genome project and an outbreak of tuberculosis in a British city, appeared to occupy separate public domains and different spheres of science and medicine. In contrast to the optimism surrounding the former, the tuberculosis outbreak was associated with a sense of return, the return of a disease of the past. This response is unremarkable. At the beginning of the twentieth century tuberculosis was a major cause of premature death in Britain. It was no longer understood as the poetic disease of an earlier Romantic age but as a disease of poverty, overcrowding, undernourishment and insanitary living conditions. As such, tuberculosis had a profound impact on those affected both in physical terms and in terms of its social consequences; it had, as René and Jean Dubos suggest, become 'a contagion, something unclean'.[8] Thus, by mid-century the decline of the disease due to a combination of public health measures, the development of effective medical treatments and the general improvements in the nation's health was a cause for optimism.[9] This national confidence was shared by the World Health Organization, which announced that many infectious diseases, including tuberculosis, were under control, and would gradually disappear.[10] However, despite the lowest ever recordings of the disease in 1987, since the early 1990s many of Britain's cities have seen a resurgence in tuberculosis.[11] Events in Leicester appear, then, as evidence of a much wider national, and indeed international, problem.[12]

That the completion of the human genome mapping and the Leicester outbreak overlapped is clearly coincidental. Yet, in so doing, they allow us to reflect on the broader social implications of interactions between science, medicine and the public. In particular, they encourage further consideration of the ways in which distinct scientific and medical events are represented in the media. Our mention of the unveiling of the human genome project is, in some senses, ironic. After all, the optimistic language surrounding new genetic discoveries mimics that of the mid-twentieth-century belief that infectious diseases would be eradicated.[13] We are reminded that this discourse of hope and confidence is perhaps an illusory one, and that wellbeing is always at a distance. However, when the language surrounding the genetic sciences is examined in more detail a much more complex picture emerges. As recent studies suggest, alongside the discourses of promise there exist discourses of concern, particularly in relation to bio-engineering and human cloning.[14] Significantly, analysis of these latter discourses reveals that the reporting of scientific events to the public is shaped not only by the media but also by links to wider social, political and economic concerns.[15]

With this in mind, we explore the notion that tuberculosis, like other diseases of signification, is socially constituted and constitutive.[16] Of particular interest is the way in which the interconnectivity between diaspora spaces and infectious disease is imagined.[17] By drawing on an already well-established literature that explores the pathologizing of the mobile, immigrant body,[18] we are able to identify a number of themes that help to shape this relationship. These include a fear of contamination from the foreign-born, the role of science and medicine in debates over the origins and subsequent spread of infectious diseases and the response of relevant authorities to both immigration and public health concerns. There is, however, one further aspect of this literature that is of relevance here: the recognition that metaphors are often deployed to frame the perception and treatment of people affected by illness and disease.[19]

That metaphors are widely used to communicate meaning and promote understanding is acknowledged.[20] Indeed, the range of metaphorical thinking within geography has expanded beyond traditional spatial and cartographic metaphors to include those relating to the body, borders, landscape, mobility and travel.[21] Although not used in the same way,[22] scholarly writing on disease and metaphor does seek to establish the form that metaphors take within social discourse and to question their impact on those most affected.[23] As Cresswell notes, the work of scholars like Susan Sontag has provided a powerful critique of the mobilization of military metaphors of disease and of how they contribute to the 'excommunicating and stigmatizing of the ill'.[24] In this paper we draw on two biological metaphors, the membrane model and the genetic model. This is not because metaphors were widely used in the discourses surrounding the tuberculosis outbreak in Leicester. Rather, it is based on a belief that these two metaphors may be employed to facilitate analysis of how the outbreak was variously interpreted in different newspaper media, and of the significance of these variations to an understanding of the relations between media representation and identity in contemporary Britain.

The paper draws on regional and national newspaper reports to offer a nuanced reading of the discourses surrounding the Leicester outbreak.[25] At regional level reference is made to Leicester's main evening newspaper, the *Leicester Mercury*.[26] At national level a wide selection of newspapers are included: popular tabloids were represented by *The Daily Mirror* and *The Sun*, middle-market tabloids by *The Daily Express* and *The Daily Mail* and the broadsheets by *The Daily Telegraph*, *The Guardian*, *The Independent*, and *The Times*. These newspapers cover a range of political allegiances, editorial approaches and readership profiles. Stories were extracted using a combination of the Lexis-Nexis database and the online archival search engines made available by the individual newspapers.

We recognize that a regional/national distinction in any guise is hard to maintain, but the distinction between these two differing scales of media reporting is significant because distance from the event appears to play a decisive role in shaping coverage. By highlighting this we are better able to examine the role played by the media in connecting certain diseases, and the people most affected by them, to broader social concerns.[27] Here, Leicester's position as one of Britain's most ethnically and culturally

diverse cities is of particular significance.[28] From the 1950s onwards, the city attracted immigrants from the Punjab, Gujarat and Pakistan. As with other areas of the country, these early arrivals were largely young men attracted by the economic opportunities offered by post-Second World War Britain. In the 1960s and 1970s the by then significant South Asian population was augmented by the arrival of more than 20 000 displaced East African families.[29]

The analytical approach adopted is interpretive, drawing implicitly on Foucauldian discourse analysis.[30] We view discourse not only as a group of signs but as practices that play a major role in the constitution of social subjectivity.[31] To this end, we identify how the discursive structures operating within the newspaper media help to shape understanding of those affected by the outbreak.[32] It is here that our distinction between the two scales of newspaper reporting is of most significance. We identify the fact that customary fears over the mobility of infectious diseases are intertwined with fears over the decline of bounded national borders. More importantly, we suggest that within the national newspaper media there is a failure to recognize that diaspora spaces are 'differentiated, contested, heterogeneous'.[33] To counter this narrow and ill-informed perspective, we draw on the metaphors of the membrane and the gene to reconsider the connectivity between disease, nation and identity in a world that is increasingly fluid, mobile, anxious and uncertain.[34]

The tuberculosis outbreak: progress, procedure and representation

Controlling an anxious city

At the geographical centre of the outbreak, management of the infection provided an important test of effective communication between scientists and Leicester city residents. The first stories to appear in the *Leicester Mercury* were published on 30 March 2001, and corresponded with the decision by public health officials at the LHA to immunize over 1 200 pupils against the disease at the Crown Hills Community College.[35] At this stage, the outbreak was not treated as a remarkable occurrence; the newspaper's readership was informed about the relatively high incidence of tuberculosis in Leicester, its symptoms and the fact that it could be treated with antibiotics.[36] Moreover, while one of the stories noted the concern of parents at the college, the tone of the reports was set by the authoritative and calming voices that informed them. The immunization programme was reported to be a 'precautionary measure' put in place by public health officials, and there was 'no major panic', according to the college's head teacher.[37] This pattern of reporting continued throughout. Thus, the *Leicester Mercury* acted both as an important source of information and as a potentially soothing influence.

While the journalists involved in reporting the story changed – with the newspaper's health correspondent, Carol Burns, taking charge once the outbreak grew in importance – it is apparent that the influence of local public health expertise remained

constant. Indeed, the *Leicester Mercury* emerged as a site through which health experts sought to communicate directly with the public. An analysis of the reports published in the newspaper highlights the tactics employed by the health authority in the attempt to control the outbreak and to minimize any anxiety felt by residents of the city. The latter was achieved in part through the maintenance of a dialogue with the paper's readership. Significantly, this dialogue was led by specialists in communicable diseases, an expertise that gave credibility to their medical reports,[38] and that facilitated broader discussion. For example, following a question and answer session with two local public health experts, the newspaper was able to provide a brief social history of the disease in Leicester. Published under the headline, 'How battle against "white death" was won', the story linked tuberculosis to the poor living conditions associated with the city's Victorian slums.[39] Moreover, it located the disease within a particular social stratum: 'if you were poor or came from a working class family, the chances were you would know someone who had died or had suffered from TB.'[40]

The above story functioned at a number of levels. First, it located the disease within a social and temporal context that people were able to comprehend. A historical lens was constructed through which the local population could view this contemporary outbreak. Secondly, tuberculosis was identified as a disease that affected many ordinary families in the city. As such, the story served as a reminder that it was not an 'exotic' disease or a disease that was necessarily brought in from the outside. The significance of this latter point was reflected in the response of local public health officials to accusations that the outbreak originated outside the city. As a report in the *Leicester Mercury* stated, 'Public health officials have been unable to identify the source of the tuberculosis outbreak despite speculation that it was brought into the country'.[41] This report did acknowledge suggestions that the city's traditionally high rates of tuberculosis were linked to people travelling to and from countries where the disease is endemic, namely the Indian sub-continent. However, such an allusion to the role of the city's South Asian population in the outbreak was quickly rebutted by Dr Philip Monk, a consultant in communicable disease control, who remarked that it was 'wild speculation' and that it would be 'unreasonable to leap to these conclusions'.[42]

As this account indicates, the question of origins, particularly in relation to infectious diseases, has important social as well as epidemiological implications.[43] The outbreak occurred during an age of anxious urbanism, a key feature of which is the fear that increased global connectivity brings with it considerable dangers to health.[44] Therefore, within the locality, public health experts were extremely careful in their management of this issue, and it is perhaps significant that it was not raised again in the *Leicester Mercury*. Indeed, rather than focusing on the search for origins, the public health gaze was focused on identifying the boundaries of the outbreak. The idea that expertise is spatially grounded has a particular resonance here.[45] The progress of the disease within the locality represented a process of 'unique historical change' in which there was uncertainty over the outcome, as public participation was crucial to the effectiveness of official control measures.[46]

The speed with which routine medical procedures could be put in place was important in minimizing the sense of panic within the city, and prompted experts to

state that they faced a 'race against time' if the disease was to be brought under control.[47] This concern was communicated to the parents of pupils at Crown Hills who had missed the opportunity to be screened before the Easter break. In a letter sent on 3 April, parents were encouraged to have their children screened at the beginning of the new term and, in addition, were reminded to contact their General Practitioners (GPs) should they develop any of the symptoms associated with tuberculosis.[48] Such letters reveal that the search for the boundaries of the outbreak was not confined to the private space of the laboratory and to communications between scientists working for the health authority and the Public Health Laboratory Service. Indeed, the identification of boundaries involved a degree of collaboration between public health experts, parents and the residents of the city. The LHA actively encouraged people to take part in a programme of self-surveillance and to consult their GPs or NHS Direct if they were concerned.[49] Such a call gave individuals an important and active role and helped the health authority to trace the extent of the outbreak.[50]

When the number of confirmed cases increased from 3 to 26 in a matter of days, public health experts were forced to acknowledge publicly that this was a 'major outbreak' of a 'very virulent form' of tuberculosis.[51] By 5 April, Dr Philip Monk was reported as saying, 'There has not been a school outbreak of this size on record ever.'[52] Yet, in defining the outbreak's local significance, the geographical spread of the disease was as important as the total number infected and the rate of increase. Where one form of public health surveillance identified the number of cases *within* the college, another, contact tracing, was used to track 'the progress of the disease'.[53] Here the fluid and permeable boundaries between the school and the community were of particular significance. Indeed, Dr Monk drew on a spatial metaphor to help explain this: 'We are looking potentially at ripples and ripples running into the community'.[54] While such surveillance techniques provided public health experts with vital information about the extent of the outbreak, the idea that it was not being contained was of particular concern to the public.[55] As one parent remarked to reporters, 'It is worrying because it is so *near*.'[56]

In this atmosphere of anxiety the *Leicester Mercury* was one of a number of sites through which the LHA sought to control public fears. The newspaper provided regular updates regarding the strategic response of the health authority to the outbreak and the network of agencies involved in managing it.[57] For example, the readership was informed that 'every city school pupil will be handed a letter, as health and education officials try to reassure parents that the city is not in the grip of an epidemic'.[58] The letter provided parents with information regarding the outbreak, including a stage-by-stage overview of the process put in place by the health authority to control it. Significantly, mention was made in the letter of a meeting to be held by national experts from the Communicable Diseases Surveillance Centre and the Public Health Laboratory Service as well as local clinicians, microbiologists and health service managers. The idea that a national network of experts was managing the outbreak was illustrated further in a story covering the visit of the deputy chief medical officer, Dr Pat Troop.[59] This network was extended yet again when the newspaper reported that 'international' experts were 'leading the fight against Leicester's tuberculosis outbreak'.[60]

Ironically, although designed to build confidence in the control measures being put in place, this information fed the anxieties of the city's population. In a further attempt to keep people informed about the tuberculosis outbreak, over 140 000 letters were sent to parents throughout Leicestershire.[61] As on previous occasions, people were advised to call NHS Direct if they were concerned. The response was overwhelming. According to reports in the *Leicester Mercury*, the number of calls to NHS Direct had doubled since the outbreak and, following this much wider circulation of information, increased to over three times the normal expected rate.[62] It is perhaps for this reason that, in addition to keeping the population informed, public health experts sought to provide constant reassurance. On 6 April the newspaper carried the following headline on its front page, 'TB: There is no need to panic. "This is not a plague city."'[63] On 7 April Dr Monk, the consultant in communicable diseases, was reported as saying, 'There is no need for people to be concerned about visiting the city. We do believe we are on top of this. We've got the outbreak under control.'[64] This message was continuously relayed to the public, using an array of authoritative voices; from public health specialists like Monk to the local director of education, Steven Andrews, who sought to assure people that they were not 'at imminent risk of contracting the disease'.[65]

Our analysis of the reporting of the outbreak in the *Leicester Mercury* reveals an ongoing dialogue between health professionals and the general public. Its purpose was to be both informative and reassuring, providing up-to-date reports on the course of the outbreak, including statistical information, and informing the population of the comprehensive strategy being put in place. Following Seale, the newspaper might be viewed as a resource through which local people were able to explore their place in relation to the event.[66] However, the analysis also suggests that as the outbreak grew and its boundaries spread beyond the confines of the school, the residents of the city became increasingly anxious. Here the *Leicester Mercury* played a crucial role. It did not seek to establish blame for the outbreak. Early links between tuberculosis and the mobility of the city's South Asian population were largely ignored. Instead, the newspaper drew on the authoritative voice of local public health experts in an attempt to reassure and calm the city. People were assured that, despite the tuberculosis outbreak being the largest recorded in a school, with one infectious case and some 313 secondary cases being identified,[67] the experts were in control.

The threat of a borderless city

It is suggested by some scholars that in order to become national news stories, scientific and medical events must be linked in some way to the social, political or economic spheres.[68] As the outbreak grew in size, its significance extended beyond the city as official communications were drawn into a web of broader reporting, wider scrutiny and critical media attention. Between the onset of the outbreak in February 2001 and the end of the coverage in May 2001 a total of 93 stories were identified in UK national daily newspapers. Of these, 47 focused entirely on the outbreak; the remaining 46 used

it as a key referent in other stories. With the exception of *The Sun*, which published a story on 31 March, the events in Leicester did not make the national newspaper media until the first week of April, when the health authority announced a major outbreak at the school.

Significantly, the outbreak in Leicester occurred at a time of heightened concern over the threat of emerging and re-emerging infectious diseases, including tuberculosis.[69] By the late 1990s, and into the new century, this threat had become an object of interest for both the mass media and the culture industries; it was argued that 'diseases can no longer be expected to stay in their country or region of origin'.[70] The recognition that diseases travel is not a novel one. However, as King suggests,[71] both scientific and popular debates link the renewed threat of epidemic diseases to a host of factors, many of which are associated with 'globalization'. They include the acceleration in international travel which, it is argued, has exposed Western populations to diseases once thought to be confined to either remote locations or to the past. Building on this thesis, a key feature of national newspaper coverage of the TB outbreak was the suggestion that the global mobility of Leicester's South Asian population acted to connect the city with a region in which tuberculosis was endemic. Thus, in contrast to the careful reporting of the event within the locality, it is apparent that greater risks were taken when writing at a distance.

On the day that the outbreak was recorded in the local newspaper, a story appeared in the health section of *The Daily Mail* under the headline, 'Tuberculosis is back'.[72] Reporting on a conference held in London by the Royal Society of Medicine, the story highlighted the return of tuberculosis, described as 'the scourge of the Victorian era', to many British cities. Drawing on the opinions of two medical experts, the story questioned why this disease had returned to Britain after a period of steady decline. For this newspaper article the answer was relatively straightforward: 'much of the increase in TB can be put down to the movement of people.' The belief that immigration was 'to blame' for the increase in the incidence of tuberculosis was one expressed by other national newspaper reporters. For example, in a story published in *The Independent* some six weeks earlier, the health editor, Jeremy Laurance, noted that the 'sharp rise in tuberculosis in Britain over the past decade, which has been widely portrayed as spreading through the indigenous population, is almost wholly confined to the immigrant community'.[73]

The belief that tuberculosis had 'returned' was not universally shared. A consultant with the Public Health Laboratory Service told the BBC, 'We have always had tuberculosis in this country, if you look back 50 years ago we had ten times more TB than we have now.'[74] Yet the consultant did acknowledge that 'an increasing proportion of [tuberculosis in Britain] is occurring in people who have lived in parts of the world where tuberculosis is much more common'. It was this connection that framed the reporting of the outbreak within the national newspaper media. More specifically, the ethnicity of pupils at the Crown Hills Community College emerged as a key issue. For example, in a story by two health correspondents writing for *The Daily Mail*, it was noted that public health officials were exploring the possibility that the disease was acquired on 'a trip abroad', and that a recent Ofsted report showed that '96

per cent of students are from minority ethnic backgrounds, the vast majority being second generation South Asians'.[75] The significance of this observation was demonstrated by comments attributed to Professor Peter Ormerod, a member of the British Thoracic Society Joint Committee on Tuberculosis, who was reported as suggesting that many of these students 'may have visited the Indian subcontinent, where TB rates are high'.

While much reporting in the national newspaper media mirrored that found locally, this focus on ethnicity emerged as a key distinguishing factor. More importantly, it was not limited to newspapers like *The Daily Mail* with well-established editorial agendas on the question of immigration. Similar statements were made in all the national newspapers studied. For example, *The Daily Telegraph* revealed that the school had a 'large number of pupils of Asian origin',[76] *The Times* that '93 per cent [of the pupils] are of Asian origin'[77] and *The Daily Express* that 'Nine out of 10 of the 1,200 pupils at the Leicester school are of Asian origin'.[78] The importance attached to ethnicity in this national reporting located the outbreak within a much broader discourse in which tuberculosis was presented as a national problem with global origins. For the then shadow health secretary, Dr Liam Fox, the outbreak mirrored the increase seen over recent years in London, which he called 'the TB capital of Europe'.[79] Comments from others extended beyond statements intended to shock. Nevertheless, they focused on a concern that the global tuberculosis epidemic, especially in its multi-drug-resistant form, was a threat to the health of the nation.[80] As an article published by *The Guardian's* health editor suggested, 'increasing numbers of multi drug-resistant TB (MDRTB) cases will arrive in the UK'.[81]

The significance of such statements is that they provide a framework for interpreting this event. While we do not argue that they are the sole definers of a particular social reality, the media does contribute to defining its contours.[82] Indeed, our analysis indicates that the events in Leicester were presented as evidence that health problems in Britain could no longer be framed in a national context. According to one story published in *The Daily Express*, the tuberculosis outbreak revealed that 'we are still vulnerable to infection from other countries' because 'immigrants and visitors from less medically advanced countries can carry the infection into Britain'.[83] Reporters in other national newspapers shared this concern. For example, stories published in both *The Guardian* and *The Daily Mail* stated that the disease would not be brought under control in Britain unless it was brought under control worldwide.[84] While each of these stories can be read differently, notably in terms of their underlying solutions, they all draw on a particular understanding of scalar politics and resort to the truism that 'disease knows no borders'.[85]

In contrast to reports in the regional newspaper which focused on public health attempts to trace and then contain the spread of the disease within the locality, the national newspaper media sought to position the outbreak in relation to broader debates about globalization and immigration. Here the ethnicity of the pupils at the college was important because it allowed assumptions to be made about the connections between Leicester and the Indian subcontinent. In making these connections some reports in the national newspaper were guarded: *The Independent*

noted that there was speculation that such a connection 'could be at the root of the onslaught',[86] *The Guardian* that it was 'possible that the child became infected on a visit to India, where TB is endemic',[87] and *The Times* that 'doctors fear that the disease may have been spread by pupils picking up the disease while travelling to areas in the Indian subcontinent, where TB is rife'.[88] These circumspect statements were, in part, influenced by the denials of such a link by the local consultant in communicable diseases, Dr Philip Monk. As the story in *The Independent* went on to observe: 'Dr Monk said: "How it was introduced we do not know. It doesn't have to be from travelling abroad."'

However, despite such a connection being denied as speculation by local public health officials, the national media continued to present the college's global links as the most likely source of the tuberculosis outbreak. In one report this scalar narrative, which targeted the mobile, immigrant body, was infused with a sense of the imperial 'Other'. In its first report on the outbreak, *The Times* carried the headline, 'Rise of disease has links to the Empire.'[89] As with other reports, the story highlighted the connection between tuberculosis and the movement of people across the globe: 'Tuberculosis has been described as the world traveller that does not need a visa. It is without a passport and indifferent to status, whether carried by traveller, refugee, asylum-seeker or economic migrant'. However, in this article, written by the '*Times* doctor', Dr Thomas Stuttaford, it was Britain's status as a post-imperial nation, as 'the hub of the old imperial territories', that was of particular concern. The story pointed to the fact that 40 per cent of tuberculosis notifications in London concerned people who had connections with the Indian subcontinent and 29 per cent related to other non-white ethnic groups, most notably from Africa. Moreover, it stated that the transformation of Britain from a 'tightly knit, static community to a component in a highly mobile global world' made outbreaks such as that in Leicester inevitable because of its position within this post-imperial network.

In effect, echoes of an imperial tropical neurosis can be detected as certain overseas territories were deemed once again to be an unhealthy threat.[90] This post-imperial hazard was closely linked with refugees, asylum seekers, the homeless and poverty, inspiring an imagery of Britain invaded with foreign migrants bringing disease into the country. Although the national newspaper media did not employ the hydraulic metaphors often associated with the reporting of asylum and immigration issues,[91] the tuberculosis outbreak in Leicester was positioned nevertheless in relation to them. Indeed, it is clear that for some national newspapers the outbreak represented further evidence of the supposed threat to the nation's health. Significantly this link was afforded legitimacy by a report produced in March 2001 by public health experts[92] at the Public Health Laboratory Service in collaboration with the British Thoracic Society and the Department of Health. This report revealed that rates of tuberculosis remained high in all ethnic minority populations: for example, among people from the Indian subcontinent it was 121 per 100 000. By contrast, among the country's white population the tuberculosis rate was 4.4 per 100 000.

Although this evidence had no direct bearing on the outbreak in Leicester, it was mobilized by many of the national newspapers to support the view that the disease

originated within the city's South Asian community. For example, the medical editor of *The Daily Telegraph* called upon one of the authors of the report, Professor Francis Drobneiwski, director of the Public Health Laboratory Service's National TB Centre, to offer some explanation for the outbreak: 'Centres like London, with high levels of population movement, and in Leicester and Blackburn, cases are higher than the national average. Our 1998 study showed that 50 per cent of the cases were among people born outside the UK'.[93] In an article in *The Daily Mirror*, another of the report's authors, Professor Peter Ormerod, was used to justify the journalist's statement that 'Experts suspect any one of the pupils or their families may have travelled to an area where the disease is rife'. As Professor Ormerod was reported as saying, 'No one knows for sure where the original case came from. It may have originated from someone who went abroad, then developed it when they got back'.[94]

Significantly, such interpretations persisted. During the period of our study the events in Leicester were used as a referent in a large number of stories. Perhaps the most relevant here are two articles published in *The Daily Mail* in May and July 2001. In the first of these, reported under the headline 'TB and the truth that dare not speak its name', a range of tuberculosis outbreaks in Britain, including in Leicester, were employed to question the failure of 'officials' to 'tell the truth' about the rise of the disease in Britain. The author, Anthony Daniels, is a medical doctor, commentator in *The Spectator* and, according to one fellow journalist, a 'Victorian evangelist'.[95] Using his position as a 'medical expert', Daniels suggested that one explanation for the rise in tuberculosis 'makes officials so uneasy that there has been a virtual conspiracy of silence about it. That explanation is the vast population movements from areas of high prevalence of the disease, such as Africa and Asia, to areas of much lower prevalence, such as Western Europe and North America'.[96]

The second story, written by the commentator Geoffrey Wansell, maintained this connection. He stated, 'We simply have to say clearly, once and for all, that the true cause of the return of tuberculosis in Britain is immigration.'[97] However, in this story Wansell constructed a particular image of the diaspora spaces in which the disease was reportedly rife. The following passage refers to the London Borough of Newham: 'YOU CANNOT ignore the face of this new, multicultural, mixed race London – where groups of Asian youths stroll past the black Africans perched on the bonnets of their white BMWs and Pakistani women push their toddlers in prams'.[98] Such cultural divisions were employed as a means to reinforce the argument that tuberculosis rates were highest in areas with large non-white immigrant populations. Newham was given particular attention, as over 50 per cent of its population is non-white and it was identified as having the highest rate of tuberculosis in the country. This representation of Newham as an alien space in the heart of London was juxtaposed with six other tuberculosis 'hot spots', including Leicester. Each of these was described as having its own 'distinctive immigrant population', implying that collectively they had more in common with the Newham than with other areas of the country.

These two stories, albeit extreme representations of tuberculosis and the outbreak in Leicester, share much in common with other accounts in the national newspaper media. Indeed, even as far ahead as November 2002 the health editor of *The*

Guardian continued to claim: 'Increased foreign travel has meant that the rich world is no longer insulated from diseases of the poor. The UK has seen an upsurge in cases of tuberculosis, some of which have been imported from the Indian sub-continent and then spread through British cities, such as the outbreak which took place at a Leicester school'.[99] Such reports interpreted the processes of globalization, of which immigration is a key part, as an inherent threat through exposing the nation 'to the revival of infectious disease'.[100] Clearly, outbreaks of infectious disease are 'social events' as well as natural phenomena.[101] The Leicester outbreak, which was regarded locally as an event that needed to be recorded and mapped, was submerged within a much broader, and in part hysterical, national and international debate regarding immigration and the global tuberculosis epidemic.[102] Within this broader debate, alternative expert voices to those managing the outbreak locally were employed to justify the scalar narratives appearing in the national newspaper media. Moreover, the fact that local public health experts refused to speculate on the source of the outbreak was, for some, evidence of a wider conspiracy. When referring to an official's insistence that the source of the Leicester outbreak was not an Asian child, Geoffrey Wansell simply retorted, 'HE IS prepared to admit, however, that Leicester has "always had a higher ratio of TB cases".'

Biological metaphors and questions of identity

Writing on colonial and postcolonial notions of global health, Nicholas King suggests that an important feature of public health practice in Western industrialized nations is a concern with borders and territoriality.[103] During the colonial era, this concern manifested itself in the strategies of avoidance, segregation and isolation established to preserve the boundaries between the West and non-West. Significantly, King argues that this concern remains. Drawing on the scientific and popular discourses that surround the emerging infectious diseases debate, he suggests that campaigners used a scalar narrative to exploit 'ambivalence about globalization and the role of modernity in the production of new risks'.[104] Put differently, King reveals how 'global' processes are argued to have 'local' consequences, and that the United States is no longer able to insulate itself from the diseases of the developing world.[105]

This narrative is not limited to debates taking place within the United States. The concern that global processes and world travel represent a risk to health is evident in the UK too. In a White Paper published two years after its general election victory in 1997, the Labour government indicated that against a background 'of overall improvement and optimism' in relation to health, formidable challenges remained.[106] 'We may have won many battles against deadly infectious diseases of the past, but some, like TB, are rising again'. In response to this concern, a follow-up document, *Getting ahead of the curve*, drew attention to infectious diseases as a 'major global threat: to health, to prosperity, to social stability, to security'.[107] Processes such as microbial adaptation, technological development, environmental change and, most relevantly, global travel and trade were identified as some of the mechanisms

underlying this growing burden of infectious disease in the UK and beyond. In order to consider the impact of this wider debate on what was essentially a local event we draw on two metaphors, the membrane model and the genetic model.

Biological metaphors have been used to represent individual, national and imperial identities.[108] Writing on cell theory, Laura Otis states that the concept of identity that emerges, what she calls the membrane model, is based on exclusion.[109] It relies on the ability to perceive borders. Otis points out that to see a structure under the microscope means to visualize a membrane that distinguishes it from its surroundings.[110] Going further, she suggests that germ theory, an elaboration of cell theory, encourages one to think even more in terms of inside and outside; after all, for clinical medicine the cause of disease is located within the confines of the body rather than in its interaction with the external environment.[111] Both cell theory and germ theory emerged in nineteenth-century science. They were inspired, at least in part, by technical refinements in the microscope.[112] But other influences shaped the scientific vision from which these theories emerged. For many postcolonial critics the optical lens of imperialism visualized hidden threats to the integrity of imperial identities.[113] As Europeans expanded their borders, the cultures, peoples and diseases they embraced began diffusing through permeable membranes back towards their imperial cell bodies.[114] In the words of Donna Haraway, the colonized (the invaded) were perceived as the invader.[115]

Echoes of this '(post)imperial invasion' are clearly evident in the national newspaper reports we analysed; one expert was quoted as saying, 'The white population exported the disease to the colonies during the last two centuries. We are only reaping what we sowed.'[116] Within those newspapers remote from the outbreak, Leicester was presented as borderless, as a postcolonial city with imperial connections, especially to South Asia. As already indicated, the geographies of the South Asian diaspora in Leicester are complex.[117] Yet within the reports in the national newspapers this complexity was lost. Instead, the area served by the Crown Hills Community College was simply reduced to its 'Asian contingent'.[118]

Significantly, a temporal element was added to this spatial logic. We have already noted that, on occasion, the city's links to the Indian subcontinent were represented in imperial terms. However, it was not only this connection that was used to establish the outbreak as evidence of the past in the present. The idea that tuberculosis was a disease of Victorian Britain was continually mentioned: for example, a report in *The Times* noted that 'TB, which was rife in the 19th century, had almost been eradicated in this country but has recently made a comeback', and another, this time in *The Independent*, stated that 'During the 19th century it [tuberculosis] was responsible for 25 per cent of all deaths in Britain'.[119] Such references to the history of the disease encouraged readers to ask questions about its re-emergence. As the *Daily Mail* reporter Rebecca Fowler suggested when describing the thoroughly modern scene of pupils 'with their Reebok trainers, Puma sweatshirts, and Nike rucksacks' leaving the college for the Easter holidays: 'It is impossible to imagine so Dickensian-sounding a disease as TB in their midst.'[120] By locating the origins of the tuberculosis outbreak in the Indian subcontinent and by identifying tuberculosis as a disease of nineteenth-century Britain,

the reporting implied that Leicester's South Asian population linked this city in the present with a disease of the past.

Thus, the 're-emergence' of tuberculosis in the UK, as expressed by the outbreak in Leicester, was directly linked to the inherent dangers of globalization and its associations with a fluid and highly mobile society.[121] Here, Leicester's South Asian population was presented as evidence that the 'global is *in* the local',[122] though not in a progressive sense.[123] However, this represents only one possible reading of the outbreak. In her final chapter, Laura Otis suggests that we abandon understandings of identity based on the membrane model and build a new concept that reflects 'the connections that we once struggled to deny'.[124] If the membrane model captured the sense of exclusivity, and with it the vulnerability, implicit in imperial approaches to boundaries and identity,[125] the genetic model, and in particular the metaphor of DNA, represents rather better postcolonial approaches. A scientific breakthrough of the postcolonial world, the identification in 1953 of the interweaving strands of DNA molecules in an intricate double helix structure,[126] is suggestive of the dynamic and fluid qualities of nation and identity.[127] In itself, this is a significant movement beyond the membrane model, because it encourages us to recognize the difference that is inherent within all diaspora spaces and the complex interactions that take place within them.[128]

Such a manoeuvre is important because it highlights the failure of the national newspaper media to represent adequately Leicester's South Asian population to its readership. By largely ignoring the distinctiveness of this diasporic community and representing it in simplistic terms, a seemingly logical route of infection was constructed. Our reading of the genetic metaphor is, however, more intricate than this; it draws on a critique of the determinism that is implicit in numerous popular and scientific accounts of genetics.[129] It recognizes that 'genocentric metaphors' are inadequate when they ignore the broader environment within which genes operate. As Richards has argued, a deterministic conceptualization implies that information is seen to flow from the gene but not to it.[130] This is significant because 'DNA may be a large and complex molecule, but alone it stands for nothing'.[131] One solution offered by Richards is to consider DNA as language, text or script.[132]

Richards's representation of DNA is not novel; it draws heavily on the work of Andrew Pollack.[133] Together, these renderings of the genetic provide us with a more sensitive way of interpreting the tuberculosis outbreak in Leicester. Indeed, the value of this particular understanding is that it allows us to identify the connections between objects and events while at the same time recognizing that the outcomes of such connectivity are contingent upon interactions that take place within a broader context. As Richards points out, '[p]erformances of the same play, even by the same cast with the same producer, can vary widely'.[134] A recognition that human variability arises from interactions between genes and the environment finds common ground with contemporary characterizations of identity as unpredictable and contingent. When we apply this more subtle interpretation, we are able to offer a further critique of the representations of the outbreak found within the national newspaper media, and in particular the view that the city's assumed links with the Indian subcontinent, via its

South Asian population, represented the only pathway along which the disease may have travelled to the city. This connection, the national newspapers inferred, was the only possible explanation for the outbreak; it was mere common sense.[135]

A subtle reading of the genetic metaphor offers an important counter-argument because it was here that the deterministic discourse surrounding the events in Leicester fed into broader nationalistic fears of infiltration – fears which acted to reinforce the symbolic and physical exclusion of the 'foreign' and immigrant body. Such representations, many of which drew on the authority of public health experts operating outside the locality, corresponded with a static and fixed view of national identity and national borders in which connections to the outside signified an ever-present threat. Following Urry, we might suggest that where the membrane metaphor implies a regional topology in which identity, while threatened from outside, is secure, familiar and safe, the genetic metaphor alludes to a fluid topology where identity is linked to the flow between regions and across permeable boundaries.[136] It is our suggestion that the genetic metaphor provides us with a way of identifying this fluidity without resorting to the negativity that surrounds it, particularly when it is associated with population mobility and infectious disease.

The unpredictability and uncertainty that is inherent in this reading of the genetic metaphor can be identified in the reporting of the outbreak by the regional newspaper media. The editorial response of the *Leicester Mercury* was to focus on the management of the disease within the locality rather than to target the city's South Asian community. Such a response might have been due to the newspaper's sensitivity to its readership, which after all would have included the very people targeted in the national newspaper media. However, it is also quite possible that the concern of local public health experts, like Dr Monk, to avoid a deterministic reading of the outbreak played a major role in this regard. As such, the *Leicester Mercury* avoided taking part in a politics of blame and instead focused its attention on public health attempts to map the boundaries of the outbreak, to allay growing anxiety within the city and to treat those infected.

Conclusion

Our findings prompt two points by way of conclusion. The first concerns the importance of scale and distance from the events. Within current analyses of the media there is widespread recognition of the role played by reporters in the construction and representation of a story. As Allan suggests, reporters are seen to make judgements regarding the fascination value of a story, its impact on the readership and its timeliness.[137] It is evident that the outbreak in Leicester was only judged to be of wider interest, both within the locality and beyond, when it was identified by health officials as a significant event. However, unlike local reporters, whose approach was measured and cautious, national newspaper media appeared willing to take greater risks in their coverage. More specifically, a simplistic and deterministic representation of the tuberculosis outbreak and of the city within which it occurred was presented to a

national audience. As Greenberg and Hier suggest, the media provides the means through which some of society's basic myths and truths are told and retold.[138] From this perspective, the national newspaper media, whether explicitly or implicitly, presented an 'imaginative' geography of Leicester's diasporic communities in an attempt to connect the city to the global tuberculosis epidemic. Here the South Asian population was presented as a homogeneous group whose main difference from their indigenous hosts was their status as a mobile population who connected the nation to its former imperial territories, and to a diseased space of the developing world. The colonial past was connected to the postcolonial present.

A comparison of these national representations with the narration of the event within the locality highlights the difference that distance makes in the reporting process. As the city became a focus of forensic examination by the local health authority, shared knowledge through dialogue with city residents was crucial to the progress of the infection and to controlling its spread. This was reflected in the regional newspaper media, where there was evidence of greater sensitivity to public anxiety, an attempt to minimize an atmosphere of panic and to avoid statements that might arouse local sensibilities. We are not implying that such sensitivity is the preserve of those writing for regional newspapers like the *Leicester Mercury*. Many examples prove this to be otherwise. Nor do we wish to overstate the importance of the regional versus national scales of newspaper reporting.[139] Nevertheless, an examination of scale helps us to focus on the different ways in which experts, the media and the public interact. Within the locality, public health experts managing the outbreak emphasized publicly that the origins of the disease were unknown at the time and that speculation would be unwise. Their concern lay with identifying the 'index case', tracing the course of the outbreak within the community, and ensuring that all those who had been affected were properly treated. At national level, expert voices were also important but in more selective ways. National media were able to legitimize the connection between the city and the tuberculosis epidemic in the Indian subcontinent, and therefore between national fears over immigration and globalization more generally, because of the credibility they bestowed on selected groups of national as opposed to local scientific expertise.

At issue here are the varying degrees of authority attached to scientific expertise and the ways in which this understanding is mobilized in the media's communication with the public. In the example discussed here, it was those public health experts working within the locality that had greatest knowledge of the tuberculosis outbreak in Leicester and for whom the search for origins was crucial in combating its spread. They had a much more intimate understanding of the area within which the outbreak had occurred and the communities that it affected. It could be argued that it was this proximity that encouraged the local experts to adopt a cautious approach to their management of the outbreak within the media, and particularly their desire to counteract any speculation over its origins. However, those experts distant from the event, appeared to take less care in their interaction with the national media. Here distance is crucial because, while we do not question the experts' knowledge of tuberculosis in the UK, we do question whether they had intimate knowledge of the Leicester outbreak. Undeniably they carried no immediate responsibility for controlling its spread.

Our second point of conclusion concerns the mobilization of the genetic metaphor as a tool of analysis. We argue that the unpredictability and uncertainty that is associated with certain readings of the genetic metaphor offers a useful way of considering how identity is constituted in the context of an increasingly fluid and interconnected society. Within the national media, the identity of Leicester's South Asian population, and of the city itself, was constituted in two ways. First, according to a narrowly defined understanding of ethnicity. There was little space within the national newspaper reports for the complexity that Avtar Brah attributes to such diasporic communities. Secondly, the identity of this population was constructed in relation to their representation as the harbingers of disease. It was this body of people who were seen to threaten the wellbeing of the nation because of an assumed desire to retain propinquity in their increasingly stretched social relations.[140]

Our reading of the genetic metaphor seeks to challenge the deterministic assumptions that are inherent in this perspective. We recognize that while a statistically defined community of people might be identified by public health experts as having higher rates of a particular disease, here tuberculosis, this knowledge should not be used to pre-empt the outcome of any subsequent search for the origins in the event of an outbreak. Following Richards,[141] the tuberculosis outbreak in Leicester might on appearances include the same cast, but the performance always has the potential to be different. Beyond this connection, the genetic metaphor has a broader appeal. It allows us to consider debates around identity, mobility and the bounded representations of national borders in a non-determinist fashion. We are able to recognize the increasing importance of population fluidity and the stretching of social relations, even when the outcomes of these are potentially negative, and at the same time counter representations that adopt a myopic perspective.

Genetics and infectious diseases tend to occupy separate spheres of science and medicine, one associated with germs of the past, the other with an optimistic future. They are also inclined to generate contrasting visions of globalization. By reference to metaphor as a mode of interpretation this paper has sought to challenge this dualism. It is undermined further if we return to the Leicester outbreak and explore practices that remained largely concealed from the public gaze in the reporting process. There are 'hidden' spaces of scientific experiment, disputation and research that are rarely mentioned. During the outbreak only passing public reference was made to the use of DNA testing to trace the source of the tuberculosis outbreak. Then, on 5 April 2003, two years later, *The Lancet* recorded that a new, more accurate test had been developed for the early diagnosis of latent infection, and that it would improve tuberculosis control by more precise targeting of preventive treatment. The Leicester outbreak had provided the opportunity to trial the test and it was noted that a network of laboratories within and beyond the city had participated in the research process. *The Lancet* emphasized that the new test was derived from the identification of genes in the *Mycobacterium tuberculosis* genome. In contrast to the familiar tuberculin (skin) test, it was not sensitive to the influence of vaccination and exposure to environmental mycobacteria and, by implication, to country of origin of the patient.[142] Tellingly, this new test reveals a closer connection between genetics and infectious diseases than many (public)

debates allow. It is also suggestive of a more constructive position on globalization and the care of those at a distance.

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Notes

[1] See J. Sulston and G. Ferry, *The common thread: a story of science, politics, ethics and the human genome* (London, Bantam Press, 2002), p. 188.

[2] See B. Nerlich, R. Dingwall and D.D. Clarke, 'The book of life: how the completion of the Human Genome Project was revealed in public', *Health: an interdisciplinary journal for the social study of health, illness and medicine* 6 (2002), p. 450; A. Smart, 'Reporting the dawn of the post-genomic era: who wants to live forever?', *Sociology of health and illness* 25 (2003), pp. 24–49.

[3] For an alternative vision of the benefits of genetics see P. Conrad, 'The mirage of genes', *Sociology of health and illness* 21 (1999), pp. 228–41; A. Petersen, 'Biofantasies: genetics and medicine in the print news media', *Social science and medicine* 52 (2001), pp. 1255–68.

[4] Communicable Disease Surveillance Centre, 'Tuberculosis outbreak at a community college in Leicester', *CDR Weekly* 11 [www.hpa.org.uk/cdr/PDFfiles/2001/cdr1401.pdf] 5 Apr. 2001, p. 1.

[5] See L. Bryder, *Below the magic mountain: a social history of tuberculosis in twentieth-century Britain* (Oxford, Clarendon Press, 1988).

[6] Communicable Disease Surveillance Centre, 'Outbreak', p. 1.

[7] M. Foucault, *The birth of the clinic: an archaeology of medical perception* (London, Tavistock, 1973).

[8] R. Dubos and J. Dubos, *The white plague: tuberculosis, man and society* (London, Gollancz, 1953), p. 66.

[9] See M. Gandy and A. Zumla, 'The resurgence of disease: social and historical perspectives on the "new" tuberculosis', *Social science and medicine* 55 (2002), pp. 385–96; M.-J. Ho, 'Sociocultural aspects of tuberculosis a literature review and a case study of immigrant tuberculosis', *Social science and medicine* 59 (2004), pp. 753–62.

[10] See D.L. Heymann and G.R. Rodier, 'Hot spots in a wired world: WHO surveillance of emerging and re-emerging infectious diseases', *Lancet infectious diseases* 1 (2001), pp. 345–53; Department of Health, *Getting ahead of the curve: a strategy for combating infectious diseases* (London, Department of Health, 2002).

[11] *Ibid*. pp. 57–58.

[12] In 1993 tuberculosis was declared a global emergency by the World Health Organization, and it is one of the three infectious diseases for which there is a global fund. See WHO, 'Information on the Global Fund', http://www.who.int/global_fund/en/ (2001) (accessed 9 July 2004).

[13] See Conrad, 'Mirage', pp. 228–30; E. Hall, 'Reading maps of the genes: interpreting the spatiality of genetic knowledge', *Health and place* 9 (2003), pp. 151–61.

[14] B. Nerlich, D.D. Clarke and R. Dingwall, 'Clones and crops: the use of stock characters and word play in two debates about bioengineering', *Metaphor and symbol* 15 (2000), pp. 223–39.

[15] S. Allan, *Media, risk and science* (Buckingham, Open University Press, 2002).

[16] S. Craddock, *City of plagues: disease, poverty, and deviance in San Francisco* (Minneapolis, University of Minneapolis Press, 2000); S. Craddock, 'Engendered/endangered: women, tuberculosis, and the project of citizenship', *Journal of historical geography* 27 (2001), pp. 338–54; P.A. Treichler, 'AIDS, homophobia, and biomedical discourse: an epidemic of signification', *October* 43 (1987), pp. 31–70.

[17] See A. Brah, *Cartographies of diaspora: contesting identities* (London, Routledge, 1996).

[18] See T. Cresswell, 'Mobility, syphilis, and democracy: pathologizing the mobile body', in G. Revill and R. Wrigley, eds, *Pathologies of travel* (Amsterdam, Cliomedica/Wellcome Series in the History of Medicine, 2000), pp. 261–77; A.M. Kraut, *Silent travellers: germs, genes and the 'immigrant menace'* (New York, Basic Books, 1994).

[19] Cresswell, 'Mobility', p. 274.

[20] G. Lakoff and M. Johnson, *Metaphors we live by* (Chicago, Chicago University Press, 1980); D. Livingstone and R. Harrison, 'Meaning through metaphor: analogy and epistemology', *Annals of the Association of American Geographers* 71 (1981), pp. 95–107.

[21] In addition to Tim Cresswell's work on disease, boundaries and mobility – Cresswell, 'Weeds, plagues and bodily secretions: a geographical interpretation of metaphors of displacement', *Annals of the Association of American Geographers* 87 (1997); Cresswell, 'Mobility' – see T. Barnes and J. Duncan, eds, *Writing worlds: discourse, text and metaphor in the representation of landscape* (London, Routledge, 1992); D. Cosgrove and S. Daniels, eds, *The iconography of landscape* (Cambridge, Cambridge University Press, 1988); S. Daniels, *Fields of vision: landscape imagery and national identity in England and the United States* (Oxford, Polity Press, 1993); A. Latham and D.P. McCormack, 'Moving cities: rethinking the materialities of urban geographies', *Progress in human geography* 28 (2004), pp. 701–24; N. Smith and C. Katz, 'Grounding metaphor: towards a spatialized politics', in M. Keith and S. Pile, eds, *Place and the politics of identity* (London, Routledge, 1993), pp. 67–83; A. White, 'Geographies of asylum, legal knowledge and legal practices', *Political geography* 21 (2002), pp. 1055–73.

[22] Smith and Katz, 'Grounding', p. 67.

[23] See S. Sontag, *Illness as metaphor* (New York, Farrar, Straus, Giroux, 1978); S. Sontag, *AIDS and its metaphors* (New York, Farrar, Strauss, Giroux, 1989).

[24] *Ibid*. p. 95, quoted in Cresswell, 'Mobility', p. 274.

[25] For a discussion of the (un)problematic uses of place within geography see N. Castree, 'Differential geographies: place, indigenous rights and "local" resources', *Political geography* 23 (2004), pp. 133–67.

[26] In May 2001 the newspaper was bought by over 250 000, which represents approximately 34% of the total adult population in the paper's marketing area. See Joint Industry Committee for Regional Press Research, 'Top line readership data for all JICREG subscribers', http://jiab.jicreg.co.uk/ (accessed 9 Feb. 2005).

[27] See J. Greenberg and S. Hier, 'Crisis, mobilization and collective problematization: "illegal" Chinese migrants and the Canadian news media', *Journalism studies* 2 (2001), pp. 563–83.

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(1.5%) and Bangladeshi (0.7%). See Office of National Statistics, 'National Census Statistics 2001', http://neighbourhood.statistics.gov.uk (accessed 9 Feb. 2005).

[29] R. Rodger, 'The built environment', in D. Nash and D. Reeder, eds, *Leicester in the twentieth century* (Stroud, Alan Sutton/Leicester City Council, 1993), p. 27.

[30] For a good introduction to this approach see S. Mills, *Discourse* (London, Routledge, 1997).

[31] N. Fairclough, *Discourse and social change* (London, Polity, 1992), p. 44.

[32] See P. A. Treichler, *How to have theory in an epidemic: cultural chronicles of AIDS* (Durham, NC, Duke University Press, 1999), p. 4.

[33] See Brah, *Cartographies*, p. 184; V. Robinson, 'The Indians: onward and upward', in C. Peach, ed., *Ethnicity in the 1991 census* (London, HMSO, 1996), pp. 95–121.

[34] See U. Beck, *Risk society: towards a new modernity* (London, Sage, 1992); J. Urry, *Sociology beyond societies: mobilities for the twenty-first century* (London, Routledge, 2000), pp. 21ff.

[35] A. Wakelin, 'Pupils are given TB jab', *Leicester Mercury* (30 Mar. 2001), p. 1; A. Wakelin, 'The facts on TB', *Leicester Mercury* (30 Mar. 2001), p. 1.

[36] *Ibid*.

[37] *Ibid*.

[38] H.M. Collins and R. Evans, 'The third wave of science studies: studies of expertise and experience', *Social studies of science* 32 (2002), p. 268.

[39] S. Brewis, 'How the battle against "white death" was won', *Leicester Mercury* (5 Apr. 2001), p. 2.

[40] *Ibid*.

[41] C. Burns, 'Testing time', *Leicester Mercury* (5 Apr. 2001), p. 3.

[42] *Ibid*.

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[44] See N. King, 'The scale politics of emerging infectious diseases', *Osiris* 19 (2004), pp. 62–76; B. Turner, 'Social fluids: metaphors and meanings of society', *Body and society* 9 (2003), pp. 1–10; Urry, *Mobilities*.

[45] D.N. Livingstone, 'Spaces of knowledge: Contributions towards a historical geography of science', *Environment and planning D: society and space* 13 (1995), pp. 5–34.

[46] Collins and Evans, 'Third Wave', p. 268.

[47] BBC, 'TB pupils treated at hospital', http://news.bbc.co.uk/1/hi/health/1261985.stm 5 Apr. 2001 (accessed 4 June 2004).

[48] General Practice in the UK forms part of the Primary Care sector. General Practitioners are the first point of contact for medical services.

[49] NHS Direct forms part of the Primary Care sector in the UK. It is a health advice service that can be accessed by telephone or online.

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[51] BBC, '"Major outbreak" of TB', http://news.bbc.co.uk/1/hi/health/1260810.stm 4 Apr. 2001 (accessed 4 June 2004); C. Burns, '5,000 to face TB testing', *Leicester Mercury* (5 Apr. 2001), p. 1.

[52] *Ibid*.

[53] A. Wakelin, 'Schools to face TB screening', *Leicester Mercury* (4 Apr. 2001), p. 6.

[54] Philip Monk, quoted in Burns, '5,000', p. 1.

[55] Burns, '5,000', p. 1.

[56] *Ibid*. (emphasis added).

[57] Burns, 'Mystery', p. 3; Burns, '5,000', p. 1.

[58] C. Burns, 'Children', *Leicester Mercury* (6 Apr. 2001), p. 1.

[59] C. Burns, 'Hundreds of pupils to get TB test early', *Leicester Mercury* (7 Apr. 2001), p. 2.
[60] C. Burns, 'Experts to decide the next step in TB battle', *Leicester Mercury* (9 Apr. 2001), p. 2.
[61] C. Burns, '140,000 parents to get letter on TB', *Leicester Mercury* (11 Apr. 2001), p. 2.
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[63] C. Burns, 'TB: there is no need to panic', *Leicester Mercury* (6 Apr. 2001), p. 1.
[64] Burns, 'Hundreds of pupils to get TB test early'.
[65] Burns, 'TB', p. 1.
[66] C. Seale, 'Health and media: an overview', *Sociology of health and illness* 25 (2003), p. 514.
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[68] See Allan, *Media*, pp. 76–80.
[69] See D. L. Heyman and G. R. Rodier, 'Hot spots in a wired world: WHO surveillance of emerging and re-emerging infectious diseases', *Lancet infectious diseases* 1 (2001), pp. 345–53.
[70] L. Garrett, 'The return of infectious disease', *Foreign affairs* 75 (1996), p. 69, quoted in King, 'Scale', p. 63.
[71] N.B. King, 'Security, disease, commerce: ideologies of postcolonial global health', *Social studies of science* 32 (2002), pp. 767–68.
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[79] BBC, 'TB tests for outbreak families', http://news.bbc.co.uk/1/hi/health/1261379.stm 5 Apr. 2001 (accessed 9 July 2001).
[80] See Harris and Marsh, 'Hundreds', p. 2.
[81] S. Boseley, 'School at centre of rare TB outbreak', *Guardian* (5 Apr. 2001), p. 3.
[82] T. Bennett, 'Media, "reality", signification', in M. Gurevitch, T. Bennett, J. Curran and J. Woollacott, eds, *Culture, society and the media* (London, Routledge, 1982), pp. 287–308.
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[91] A. White, 'Geographies of asylum, legal knowledge and legal practices', *Political geography* 21 (2002), pp. 1055–73.
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[98] *Ibid*.
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[101] E. Stark, 'The epidemic as a social event', *International journal of health services* 7 (1977), pp. 681–705, cited in L.J. Ray, 'AIDS as a moral metaphor: an analysis of the politics of the "Third Epidemic"', *Archives européennes de sociologie* 30 (1989), p. 243.
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[103] King, 'Security', p. 772.
[104] King, 'Scale', p. 64.
[105] King, 'Security', pp. 771-76.
[106] Department of Health, *Saving lives: our healthier nation* (Cm 4386, 1999), p. 16.
[107] Department of Health, *Getting ahead of the curve*, p. 9.
[108] See e.g. M. Sutphen and B. Andrews, eds, *Medicine and colonial identity* (London, Routledge, 2003).
[109] L. Otis, *Membranes: metaphors of invasion in nineteenth-century literature, science and politics* (Baltimore, Johns Hopkins University Press, 1999).
[110] *Ibid*. p. 4.
[111] Conrad, 'Mirage', p. 230.
[112] W.F. Bynum, *Science and the practice of medicine in the nineteenth century* (Cambridge, Cambridge University Press, 1994).
[113] See D. Kennedy, 'Imperial history and postcolonial theory', *Journal of imperial and Commonwealth history,* 24 (1996), pp. 345–63.
[114] Otis, *Membranes*, p. 5.
[115] D. Haraway, *Simians, cyborgs and women: the reinvention of nature* (London, Routledge, 1991), p. 223.
[116] Wansell, 'Return', p. 36.
[117] See Rodger, 'Built environment', pp. 26–27; D. Byrne, 'Class and ethnicity in complex cities: the cases of Leicester and Bradford', *Environment and planning A* 30 (1998), pp. 703–20.
[118] Fowler, 'Spectre', pp. 18-19; C. Milmo, 'Fear grips school at the centre of TB outbreak', *Independent* (6 Apr. 2001), p. 10.
[119] Wright, 'Screening', p. 4; Milmo and Hartley, 'Number', p. 5.
[120] Fowler, 'Spectre', pp. 18-19.
[121] Turner, 'Social fluids', pp. 1–10
[122] Castree, 'Differential geographies', p. 135.

[123] See D. Massey, 'Power-geometry and a progressive sense of place', in J. Bird, B. Curtis, T. Putnam, G. Robertson and L. Tickner, eds, *Mapping the futures* (London, Routledge, 1993), pp. 59–69.

[124] Otis, *Membranes*, p. 173, cited in P.G. Beidler, 'Review of *Membranes* by Laura Otis', *Literature and medicine* 19 (2000), pp. 297–300.

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[126] J. Watson, *The Double Helix: a personal account of the discovery of the structure of DNA* (London, Atheneum, 1968).

[127] See D. Massey, 'Geographies of responsibility', *Geografiska Annaler* 86 B (2004), pp. 5–18; A. Amin, 'Regions unbound: towards a new politics of place', *Geografiska Annaler* 86 B (2004), pp. 33–44.

[128] Brah, 'Cartographies', pp. 180–81.

[129] Hall, 'Genes', pp. 151–52.

[130] M. Richards, 'How distinctive is genetic information?', *Studies in history and philosophy of biological and biomedical sciences* 32 (2001), pp. 663–87.

[131] *Ibid*. p. 668.

[132] *Ibid*. p. 674.

[133] A. Pollack, *Signs of life: the language and meanings of DNA* (Boston, Houghton Mifflin,1994).

[134] Richards, 'How distinctive', p. 674.

[135] See Cresswell, 'Weeds' p. 338.

[136] Urry, *Mobilities*, p. 32.

[137] Allan, *Media*, p. 76ff.

[138] Greenberg and Hier, 'Crisis', pp. 565–66.

[139] This is not an attempt to impose the kind of strong boundaries around place that Castree criticizes. See Castree, 'Differential geographies', p. 135.

[140] See J. Urry, 'Connections', *Environment and planning D: society and space* 22 (2004), pp. 27–37.

[141] Richards, 'How distinctive', p. 674.

[142] Ewer *et al*., 'Comparison', pp. 1168–73.